

Fig. 1A

GAAGCAAGGAGGCGGCGGCGGCCGAGCGAGTGGCGAGTAGTGGAACGTTGC
 TTCTGAGGGGAGCCCAAGATGACCGGTTCTAACGAGTTCAAGCTGAACCAGCC
 ACCCGAGGATGGCATCTCCTCCGTGAAGTTCAGCCCCAACACCTCCAGTTCCT
 GCTTGTCTCCTCCTGGGACACGTCCGTGCGTCTCTACGATGTGCCGGCCAACCTCC
 ATGCGGCTCAAGTACCAGCACACCGGCGCCGTCTGGACTGCGCCTTCTACGAT
 CCAACGCATGCCTGGAGTGGAGGACTAGATCATCAATTGAAAATGCATGATT
 TGAACACTGATCAAGAAAATCTTGTTGGGACCCATGATGCCCCTATCAGATGT
 GTTGAATACTGTCCAGAAGTGAATGTGATGGTCACTGGAAGTTGGGATCAGA
 CAGTTAAACTGTGGGATCCCAGAACTCCTTGTAATGCTGGGACCTTCTCTCAGC
 CTGAAAAGGTATATACCCTCTCAGTGTCTGGAGACCGGCTGATTGTGGGAACA
 GCAGGCCGCAGAGTGTTGGTGTGGGACTTACGGAACATGGGTTACGTGCAGCA
 GCGCAGGGAGTCCAGCCTGAAATACCAGACTCGCTGCATACGAGCGTTTCCAA
 ACAAGCAGGGTTATGTATTAAGCTCTATTGAAGGCCGAGTGGCAGTTGAGTA
 TTTGGACCCAAGCCCTGAGGTACAGAAGAAGAAGTATGCCCTCAAATGTCAC
 AGACTAAAAGAAAATAATATTGAGCAGATTTACCCAGTCAATGCCATTTCTT
 TTCACAATATCCACAATACATTTGCCACAGGTGGTTCTGATGGCTTTGTAAAT
 ATTTGGGATCCATTTAACAAAAAGCGACTGTGCCAATTCATCGGTACCCAC
 GAGCATCGCATCACTTGCCTTCAGTAATGATGGGACTACGCTTGCAATAGCGT
 CATCATATATGTATGAAATGGATGACACAGAACATCCTGAAGATGGTATCTT
 CATTCGCCAAGTGACAGATGCAGAAACAAAACCCAAAGTCACCATGTACTGA
 CAAGATTTCACTTAAAGTGCCATGTTGATGATAATAAAACAATTCGTAC
 TCCCCAATGGTGGATTTATTACTATTAAGAAACCAGGGAAAATATTAATTT
 TAATATTATAACAACCTGAAAATAATGGAAAAGAGTTTTTTGAATTTTTTTT
 TTTAAATAAACACCTTCTTAAGTGCATGAGATGGTTTGATGGTTTGCTGCATT
 AAAGGTATTTGGGCAAACAAAATTGGAGGGCAAGTGACTGCAGTTTGAGA
 ATCAGTTTTGACCTTGATGATTTTTTTGTTTCCACTGTGGAATAAATGTTTGTA
 AATAAGTGAATAAAAAATCCCTTTCATTCTTTCTGGACCTTAAATGGTAGA
 GGAAAAGGCTCGTGAGCCATTTGTTTCTTTTGCTGGTTATAGTTGCTAATTCTA
 AAGCTGCTTCAGACTGCTTCATGAGGAGGTTAATCTACAATTAACAATATT
 TCCTCTTGGCCGTCCATTATTTTCTGAAGCAGATGGTTCATCATTTCTGGGCTG
 TTAACAAAGCGAGGTTAAGGTTAGACTCTTGGGAATCAGCTAGTTTTCAAT
 CTTATTAGGGTGCAGAAGGAAAACCTAATAAGAAAACCTCCTAATATCATTTT
 GTGACTGTAAACAATTATTTATTAGCAAACAATTGATCCAGAAGGGCAAAT
 TGTTTGAGTCAGTAATGAGCTGAGAAAAGACAGAGCATATCTGTGATTTTGG
 AAAAAATAATTGTAACGTAATTGCAGTGCATTTAGACAGGCATCTATTTGGAC
 CTGTTTCTATCTCTAAATGAATTTTTGGAAACATTAATGAGGTTTACATATTT
 CTCTGACATTTATATAGTTCTTATGTCCATTTAGTTGACCAGCCGCTGGTGAT
 TAAAGTTAAAAAGAAAAAATTATAGTGAGAATGAGATTCATTTCAATGTA
 ATGCACTAAAGCAGAACACGAACCTTAGCTTGGCCTATTCTAGGTAGTTCCAA
 ATAGTATTTTGTGTCAAACCTTTAAATTTATATTAATTTGCAAATGTATGT
 CTCTGAGTAGGACTTGGACCTTTCTGAGATTTATTTTATCCGTGATGTATTTT
 TTTTAATTTCTTTGATACAGAGAAGGGCTTTTTTTTTTTAAGTATTTCAAGTGA
 AAACCTGGTGTAAGTCTGAACCCATCTTTGAAATGTATTTCTTCATTGCAG

Fig. 1B

GTCCACCTAATCATCCTGTGAAAGTGGTTTCTCTATGGAAAGCTTTGTTTGCTT
 CCTACAAATACATGCTTATTCCTTAAGGGATGTGTTAGAGTTACTGTGGATTT
 CTCTGTTTTCTGTCTTACAAGAACTTGTCTATGTACCTTAATACTTTGTTTAG
 GATGAGGAGTCTTTGTGTCCCTGTACAGTAGTCTGACGTATTTCCCCTTCTGTC
 CCCTAGTAAGCCCAGTTGCTGTATCTGAACAGTTTGAGCTCTTTTGTAAATATA
 CTCTAAACCTGTTATTTCTGTGCTAATAAACGAGATGCAGAACCCCTTGAAAA
 AAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

Fig. 1B
 (Continued)

Alignment of predicted *huBUB3* gene products from ~1.4 Kb cDNA and ~2.7 Kb cDNA

	20	40	60
huBUB3 2.7	MTGSNEFKLNQPPEDGISSVKFSPNTSQFLLVSSWDTSVRLYDVPANSMRLKYQHTGAVL		
huBUB3 1.4	MTGSNEFKLNQPPEDGISSVKFSPNTSQFLLVSSWDTSVRLYDVPANSMRLKYQHTGAVL		
	80	100	120
huBUB3 2.7	DCAFYDPTHAWSGGLDHQLKMHDNLTDQENLVGTHDAPIRCVEYCPEVNMVMTGSWDQTV		
huBUB3 1.4	DCAFYDPTHAWSGGLDHQLKMHDNLTDQENLVGTHDAPIRCVEYCPEVNMVMTGSWDQTV		
	140	160	180
huBUB3 2.7	KLWDPRTPCNAGTFSQPEKVYTLVSGDRLIVGTAGRRVLWDLRNMGYVQQRRESSLKY		
huBUB3 1.4	KLWDPRTPCNAGTFSQPEKVYTLVSGDRLIVGTAGRRVLWDLRNMGYVQQRRESSLKY		
	200	220	240
huBUB3 2.7	QTRCIRAFPNKQGYVLSSIEGRVAVEYLDPSPEVQKKKYAFKCHRLKENNIEQIYPVNAI		
huBUB3 1.4	QTRCIRAFPNKQGYVLSSIEGRVAVEYLDPSPEVQKKKYAFKCHRLKENNIEQIYPVNAI		
	260	280	300
huBUB3 2.7	SFHNIHNTFATGGSDGFVNIWDPFNKKRLCQFHRYPTSIASLAFSNDGTTLAIASSYME		
huBUB3 1.4	SFHNIHNTFATGGSDGFVNIWDPFNKKRLCQFHRYPTSIASLAFSNDGTTLAIASSYME		
	320		
huBUB3 2.7	MDDTEHPEDGIFIRQVTD AETKPKSPCT		
huBUB3 1.4	MDDTEHPEDGIFIRQVTD AETKPKVHLIIL		

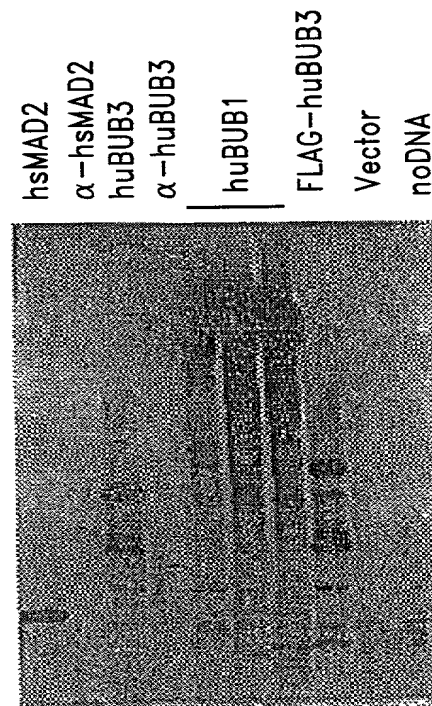
Fig. 2

scBUB3	1	-----MQIVQIEQAPKDYISDIKIIP---SKSLLL	27
muBUB3	1	-----MTG-----SNEFKLNQPPEDGISSVKFSPN--TSQFLL	31
huBUB3	1	-----MTG-----SNEFKLNQPPEDGISSVKFSPN--TSQFLL	31
rae1-hu	1	MSLFGTTSFGTSGTSMFGSATT--DNHNPMKDIEVTSSPDDSIGCLSFSPPTLPGNFLI	58
rae1	1	MSLFG-----QATTSTVSNATG-----DLKKDVEVAQPPEDSISDLAFSP---QAEYLA	46
yet7	1	MSFFNR-----SNTTSALGTSTAMANEKDLANDIVINSPAEDSISDIAFSP---QQDFMF	52
		. D I . P	
scBUB3	28	-----I----- -ITSWDGSLTVYKFDIQAKNVDLLQSLRYKH--PLLCCNFI-DNTDLQIYVGTVOGEILK	83
muBUB3	32	-VSSWDT--SVRLYDVPA--NSM-R-LKYQHTGAVLDCAFY-DPT--HAWSGGLDHQLKM	81
huBUB3	32	-VSSWDT--SVRLYDVPA--NSM-R-LKYQHTGAVLDCAFY-DPT--HAWSGGLDHQLKM	81
rae1-hu	59	-AGSWAN--DVRCEVQDSGQTI PK-AQQMHTGPVLDVCWSDDGS--KVFTASCDKTAKM	112
rae1	47	-ASSWDS--KVRIYEVQATGQSIGK-ALYEHQGPVLSVNWSRDGT--KVASGSVDKSAKV	100
yet7	53	SASSWDG--KVRIWDVQN-GVPQGR-AQHESSPVLCTRWSNDGT--KVASGGCDNALKL	106
		SW VL D . .	
scBUB3	84	-----III----- VDLIGSPSFQALTNNEANLGICRICKYGD--DKLIAASWDGLIEVIDPRNYGDGVIAVKN	141
muBUB3	82	HDLNTDQENLVGTHDAPIRCVEYCEPVNV---MVTGSWDQTVKLWDPR-TPCNAGTFS-	135
huBUB3	82	HDLNTDQENLVGTHDAPIRCVEYCEPVNV---MVTGSWDQTVKLWDPR-TPCNAGTFS-	135
rae1-hu	113	WDLSSNQAIQIAQHDAVPKTIHWIKAPNY--SCVMTGSWDKTLKFWDTIR-SSNPMMVLQ-	168
rae1	101	FDIQTGQNQQVAAHDDAVRCVRFVEAMGT-SPILATGSWDKTLKYWDLR-QSTPIATVS-	157
yet7	107	YDIASGQTQQIGMHSAPIKVLRFVQCGPSNTECIVTGSWDKTIKYWDMR-QQPQVSTVM-	164
		D.SWD . D R	
scBUB3	142	-----IV----- LNSNNTKVKNKIFTMDTNSSRLIVGMNNSQVQWFRPLCEDDNGTIEESGLKYQIRDVAL	201
muBUB3	136	Q-----PEKVYTLVSGDRLIVGTAGRRVLVWDLNMGYVQQRRE-SSLKYQTRCIRA	187
huBUB3	136	Q-----PEKVYTLVSGDRLIVGTAGRRVLVWDLNMGYVQQRRE-SSLKYQTRCIRA	187
rae1-hu	169	L-----PERCYCADVIYPMVAVATAERGLIVYQLENQPSEFRRIE-SPLKHQHRCAI	220
rae1	158	L-----PERVYAMDCVHPLLTVATAERNICVINLSEPTKIFKLAM-SPLKFQTRSLAC	209
yet7	165	M-----PERVYSMDNKQSLLVATAERHIAIINLANPTTIFKATT-SPLKWQTRCVAC	216
		. . . V . L S L K Q R .	

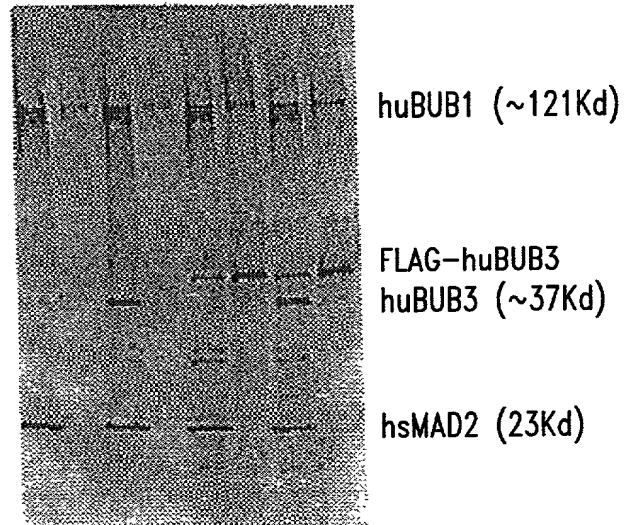
Fig. 3A

V				
scBUB3	202	LP---KEQEGYACSSIDGRVAVEFFDDQGGDDYNSSKRFAFRCHRLNLKD-TNL-----	250	
muBUB3	188	FP---NK-QGYVLSSIEGRVAVEYLDPS-PEV-QKKKYAFKCHRLKENN-IEQ-----	233	
huBUB3	188	FP---NK-QGYVLSSIEGRVAVEYLDPS-PEV-QKKKYAFKCHRLKENN-IEQ-----	233	
rae1-hu	221	FKDKQNKTGFALGSIEGRVAIHYNPP-NP--AKDNFTFKCHRSNGTNTSAP-----QD	272	
rae1	210	F----IKGDGYAIGSVEGRCAIQNIDE--KN--ASQNFsFRCHRNQAGN-SAD-----	253	
yet7	217	Y----NEADGYAIGSVEGRCSIRYIDDG-MQ--KKSgFSFKCHRQTNPn-RAPGSNGQSL	268	
		G. S..GRF.CHR	
VI				
scBUB3	251	AYPVNSIEFSPRHKFLYTAGSDGIISCWNLQTRKKIKNFAKFNEd-SVVKIACSDNILCL	309	
muBUB3	234	IYPVNAISFHNIHNTFATGGSDGFVNIWDPFNKKRLCQHRYPTSIASLAFSNDGTTLAI	293	
huBUB3	234	IYPVNAISFHNIHNTFATGGSDGFVNIWDPFNKKRLCQHRYPTSIASLAFSNDGTTLAI	293	
rae1-hu	273	IYAVNGIAFHHPVHGTLATVGSdGRFSFWDKDARTKLKTSEQLDQPISACCFNHNGNIFAY	332	
rae1	254	VYSVNSIAFHFPQYGTfSTAGSDGTFSFWDKDSHQRLKSYPNVGGTISCSTFNRTGDIFAY	313	
yet7	269	VYPVNSIAFHPLYGTfVTAGGDGTfNFWDKNQRHRLKGYPTLQASIPVCSFNrNGSVFAY	328	
		Y VN I F T G DG W	
scBUB3	310	ATSDDTFKTNAaIDQTIELNASSIYIIFDYEN-----	341	
muBUB3	294	ASSMYEMDDT-EHPE---DGIFIRQVTDaETKPKS---T	326	
huBUB3	294	ASSMYEMDDT-EHPE---DGIFIRQVTDaETKPKSPC-T	328	
rae1-hu	333	ASSYDWSKGHEFYNPQKK-NYIFLRNA-AEELKPRNKK--	368	
rae1	314	AISYDWSKGyTFNNAQLP-NKIMLHPVPQDEIKPRPKKGR	352	
yet7	329	ALSyDWHQGHMGNRPDYP-NVIRLHATTDEEVKEK-KK-R	365	
		A S . E		

Fig. 3B

Fig. 4A

FLAG-huBUB3	-	-	+	+
huBUB3	-	+	-	+
huBUB1	+	+	+	+
hsMAD2	+	+	+	+
α -FLAG	S	P	S	P

*Fig. 4B*

mRNA expression of BUB/MAD homologs in various tissues.

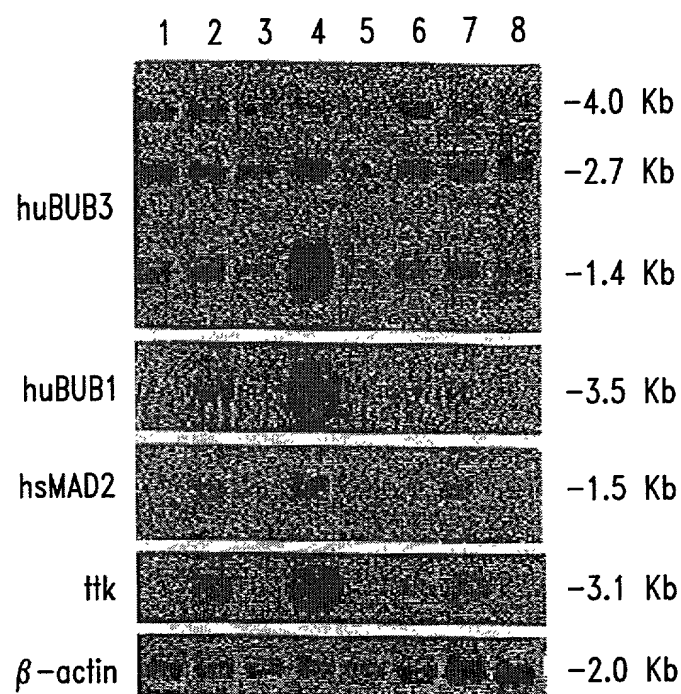


Fig. 5